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**Studies on the Ethnomedicinal Plants of Suddhowala region  
of Doon valley**

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**Abstract**

The medicinal plants have played a significant role in the most convenient and effective manner in health care. About 80% of traditional medicines used for principal health care are derived from plants. In spite of their naturally and easily availability, cost effectiveness, safe and regenerative qualities; tribal people had deep knowledge about these medicinal plants, due to their long term association with the forest from time immemorial. An ethno botanical survey was carried out to collect information about medicinal plants used for the treatment of various diseases by the local inhabitants of Suddhowala region of Doon Valley, Tehsil Sahaspur, Uttarakhand. A total of **41** plant species belonging to **25** families were used to treat diseases in the region. Most of the plant species used were herbs (41%) followed by trees (32%), shrubs (24%) and climber (3%). The medicinal preparations include powder, decoction, juice, etc. The present study was focused to explore the traditional medicinal plant wealth that is being used by the rural people of the study area.

Key words: Herbal Medicines, Ethnobotany, Indigenous People, Suddhowala

**Introduction**

Plants are the oldest associates of man from very ancient times. Ethnobotany is an interdisciplinary field exploring the relationship between plants and people. Alcorn (1984) regarded ethnobotany as the study of contextualized plant use whereas Jain (1987) elaborated it as “The total natural and traditional relationship and the interactions between man and his surrounding plant wealth”. According to Pushpangadan (1990), the term refers to the study of the knowledge system pertaining to the multidimensional perspective of life, culture, traditions as well as interaction of traditional or less advanced human communities like tribals with their local flora (Ethnobotany) or fauna (Ethnozoology). Ethnomedicine is the study of traditional medicines, whether written or remembered and transmitted via oral tradition. The use of plants and plant products as medicine can be traced as far back as the beginning of human civilization. As the local people are settled far from urban area, they cannot take modern healthcare facilities so they are totally dependent on traditional medicinal practices for their primary health care.

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Considerable amount of knowledge on the traditional uses of plants is available with the indigenous people who are considered as the repository of accumulated experience and knowledge of indigenous flora and fauna (Jain, 2004). The World Health Organization (WHO) suggested that as many as 80% of world’s people depend on traditional medicine for their primary health care needs (Prakash, 2014).

The traditional communities of Uttarakhand have a rich wealth of medicinal plants and they are still dependent upon wild plants for their primary health care system and treatment of various diseases. Herbal medicines even today play an important role in rural areas with various locally produced drugs still being used as home remedies for various diseases (Qureshi *et al.*, 2005). Growing demand for herbal products, in the recent past, has led to a quantum jump in volume of plant material traded globally. This traditional knowledge of health care systems has started disappearing with the passage of time due to scarcity of literature and relatively low or no income to the traditional herbal practitioners. Hence, sincere efforts have been made to document the various uses of plants before some of them disappear from the areas, or before these inhabitants shift over to modern system of remedies.

## Material and Methods

### Study site (Fig 1)

**Suddhowala** is a village located in Sahaspur tehsil in Dehradun district of Uttarakhand state, India. Suddhowala is surrounded by Vikasnagar tehsil toward north-west, Kalsi tehsil toward North, Poanta Sahib tehsil toward west, Dehradun tehsil toward east. Suddhowala is located around 19.8 km away from Dehradun. The climate is humid subtropical, although it varies from tropical: from hot in summer to several cold depending upon the season. Summer temperature can reach up to 44° C for a few days and hot wind called loo blows whereas winter temperature usually between 1 to 20° C and fog is quite common. Soil is fertile alluvial. Region has adequate drainage system and receives plentiful rainfall. Major crops cultivated here are rice, wheat, maize, sugarcane and major fruits cultivated are strawberry, pear, lemon, guava and litchies.



### Methodology

For information on Ethnobotany of Suddhowala region of Doon valley, various field surveys were undertaken in its various rural pockets in different seasons during the year 2015-2016. The desired information on Ethnobotanical aspects was collected through interviews from knowledgeable people (family heads, housewives, elder persons, experienced farmers of the community). Also plant specimens were collected from their natural habitat, dried, preserved and mounted. The specimens were identified by carefully matching with the specimen at the herbarium of Forest Research Institute (FRI). Herbarium has been deposited in the Botany lab, Alpine Institute of Management and Technology.

### Results and Discussion

During present investigation, 41 species belonging to 25 families were recorded to be useful for the treatment

of various diseases (Table 1). Overall diversity grouped into 20 wild species whereas the remaining 21 are cultivated. Herbs were dominating with 41% species as compared to trees (32%), shrubs (24%) and climbers (3%) (Figure 2). Various methods of preparation of these herbal remedies have been recorded. These plants are used in various diseases like dysentery, diarrhoea, ulcer, liver diseases, constipation etc. Different plant parts such as Roots (21.95%), Stem (2.43%), Leaves (73.17%), Fruits (26.82%), Flowers (21.95%), Seeds (26.87%), Whole Plant (14.63%), Bark (12.19%), Latex (12.19%) and were used for the preparation of traditional medicines (Figure 3).

### Conclusion

In conclusion it can be said that the medicinal plants are the richest source of traditional medicines, phytopharmaceuticals, many modern allopathic drugs, household remedies, cosmetics etc. with wide acceptance. This multifaceted role of plants has globally reawakened scientific interest in them in the recent years. These people are self-sufficient and maintain a balanced ecological rhythm in doon valley. But these valuable species are need to be protected and managed urgently by following a wealth of conservation oriented practices and adopting integrated management sustainable reserves.

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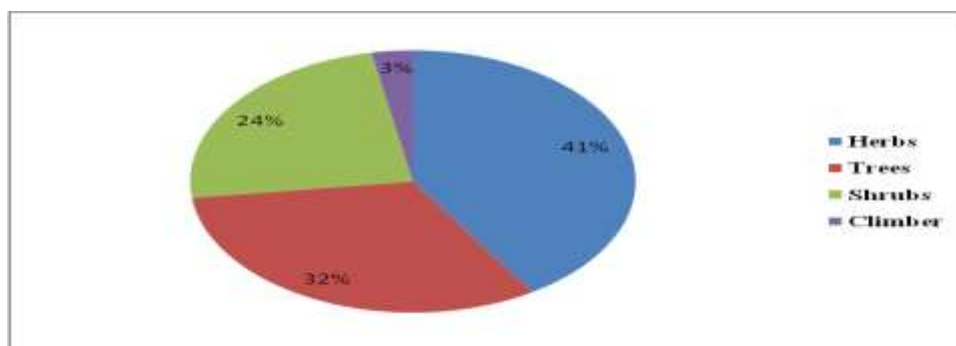


Fig. 2: Habit wise differentiation of Plants Used by Rural Populace of Suddhowala

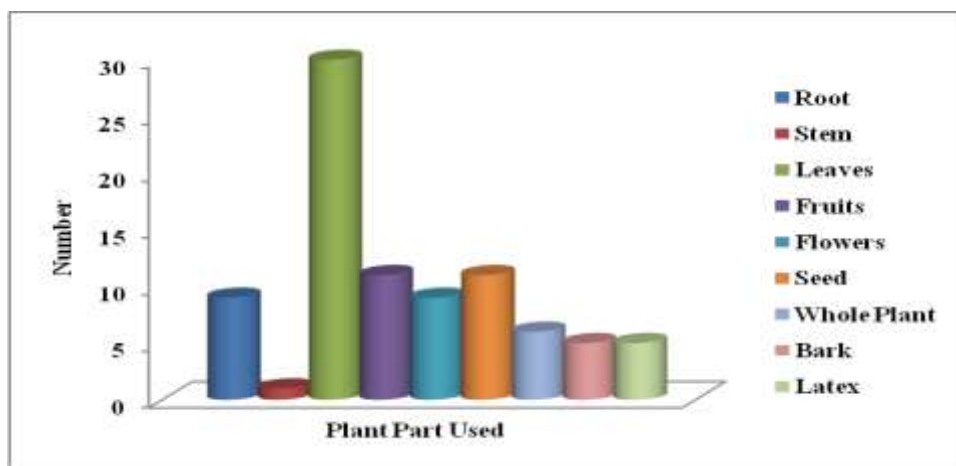


Fig. 3: Analysis of different plant parts used ethnomedicinally by the inhabitants of Suddhowala

Table I: Medicinal Plants of Suddhowala Region of Doon Valley, Uttarakhand

Botanical name	Local name	Family	Part used	How to Use
<i>Adhatoda vasica</i>	Basuti	Acanthaceae	Leaves	The fresh leaves used to cure cough, fever, asthma and dysentery. The fresh leaves are boiled in an earthen pot for 20min. and then warm vapours are inhaled for 5min. in case of asthma. Patients having sore throat during cold and cough take decoction for instant relief. Boiled leaves are crushed and the paste is used to cure dysentery. Fresh leaves are very effective in treating bleeding gums. Rub the paste of leaves gently on the gums daily for strengthening.
<i>Aegle marmelos</i>	Bael	Rutaceae	Leaves, fruits (both ripe and unripe), root.	Leaf paste is used as an external application for treating ulcers and maggot infested sores. The leaf juice is mixed with black pepper and given in dropsy, constipation and jaundice. The unripe fruit is astringent, stomachic, anti-scorbutic and digestive. Root is one of the ingredients of "Dashmula", a common ayurvedic formulation, particularly useful in loss of appetite and puerperal diseases.
<i>Aloe vera</i>	Ghrita-	Liliaceae	Leaves	Good for skin; hydrates and nourishes it. It is a great sun

	kumari			burn healing agent. Massage of <i>Aloe vera</i> on the scalp helps in hair growth and silky. Taking <i>Aloe vera</i> for 3 months helps in reducing blood sugar level and maintaining cholesterol level.
<i>Argemone Mexicana</i>	Satyanashi	Papaveraceae	Milky juice (latex), leaves, roots and seeds	The juice of the plant is used in jaundice and skin problems. Leaves are useful in cough, wounds, ulcers and skin diseases. Make powder of roots after cleaning them and take this powder with misri to cure impotency. Its latex, leaf juice extract and seed oil are applied externally to heat wounds faster and in skin diseases. Seed paste or seed oil is applied over joints to relieve from arthritis pain.
<i>Azadirachata indica</i>	Neem	Meliaceae	Seed oil and leaves	Oil is used to control various skin infections. Neem leaves are used to treat chicken pox and warts by directly applying to the skin in a paste form or by bathing in water containing neem leaves. Neem tea is traditionally taken internally to reduce fever caused by malaria. Eat 2-3 tender leaves with honey or drink neem tea, it is beneficial in controlling blood sugar and helpful in preventing or delaying the onset of diabetes.
<i>Bacopa monnieri</i>	Brahmi	Scrophulariaceae	Whole plant oil	Oil is good for making the hair strong and also used against dandruff, itchiness, formation of split ends and hair loss. In Insomnia massaging the scalp with brahmi oil helps to overcome sleep disorder which leads to cure depression, anxiety, tension and stress. In mental problems brahmi oil has refreshing effects on mind, used as mental tonic that helps in focused concentration.
<i>Berberis aristata</i>	Daruhaldi	Berberidaceae	Whole plant specially leaves	Plant decoction used to cure stomach infection, piles, ulcers, fever, constipation and jaundice. Mix plant decoction with ghee and alum, then apply in eyes for eye problems. Take decoction of roots twice a day, it is beneficial in piles. Take decoction of plants with a tsp of honey for jaundice. Apply mashed leaves on boils, ulcers, skin diseases and wounds. Take decoction of plant with amla powder, it is beneficial in case of painful urination.
<i>Calotropis procera</i>	Aak	Asclepiadaceae	Leaves, latex and bark	Powder of leaves mixed with sugar and is taken orally with water to cure fever. Latex is applied on joints to reduce swelling. Few drops of latex are mixed with ghee and is applied on eyelids to reduce redness of eyes. For tuberculosis 3-4 drops of latex are mixed and administered orally or 1-2 flowers heated in ghee and are consumed as such. Fresh inner bark is tied as natural bandage on wounds for early healing.
<i>Cannabis sativa</i>	Bhang	Cannabaceae	Dried flowers or flowering tops and resinous exudation	It helps in treating nausea, vomiting, intended weight loss and lack of appetite. Cannabis oil helps in reducing stress and allows calm and peaceful feelings. Cannabis oil is useful in insomnia, relieves chronic pain and inflammation. Applying cannabis oil to skin stimulates the shedding of dead skin cells and promotes a fresh and glowing appearance.
<i>Catharanthus roseus</i>	Sadabahar	Apocynaceae	Whole plant specially leaves	The juice of leaves is used as an antidote against wasp stings. Plant is used in the treatment of hypertension and mental disorder like depression and insanity. Crude

				leaves extract posses anti-cancer property. Also helps in toothache, memory loss and blood circulation. The leaf juice extract is used in treatment of diabetes.
<i>Centella asiatica</i>	Mandook purni	Apiaceae	Leaves	Leaves applied on wounds protect against infection. Green leaves are chewed fresh in the morning on an empty stomach for improving memory and sharpening the brain. Leaf powder mixed with milk given to children to soothe mental disorder. Tea is useful for relieving headaches and indigestion.
<i>Chenopodium album</i>	Bathua sag	Chenopodia ceae	Leaves and seeds	It is very effective in removing kidney stones. Taking the extract of leaf juice daily reduces the tendency of stone formation and internal swelling. For external swellings steamed leaves are applied on them. Boil seeds and dry ginger powder and reduce it to half, drain it and drink twice a day to cure irregular periods.
<i>Cichorium intybus</i>	Kasni	Asteraceae	Whole plant, root, seed, flower.	The juice of the herb, carrot and celery is very useful in relieving asthma as well as high fever. Decoction of flowers, seeds and roots of the plant is beneficial in relieving sluggishness of liver, jaundice, enlargement of spleen etc. It is an effective blood tonic and helps in reducing anaemia. It is also helpful during constipation. It is one of the best source of Vitamin A which is very good for eyes.
<i>Citrus limon</i>	Nimbu	Rutaceae	Fruits	Add lemon juice and honey to hot tea to reduce fever, flu and nausea. It also eliminates gallstones with olive oil. Hot lemon water relieves chest congestion and cough, reduce allergies, clear the palate and freshen breath. Lemon juice applied on cotton and placed in the nostrils stops nose bleeding.
<i>Corandrium sativum</i>	Dhaniya	Apiaceae	Fresh leaves	Dried leaf powder is mixed in water and boiled, some sugar is added to it and the mixture is consumed, it is effective in treating stomachache. Paste of leaves is applied on forehead for relieving headache and it is also applied in mouth for treating ulcers. It helps in preventing nausea and vomiting.
<i>Datura metel</i>	Datura	Solanaceae	Leaves, fruits	Leaves are internally used in relieving the spasm of bronchitis in asthma. The juice of its fruit is applied to the scalp, to treat dandruff and hairfall. The roasted leaves are applied over the area to relieve pain. The fruit can be used to reduce certain types of fevers. Also effective for the treatment of malaria. The fruit can be directly consumed after being burnt.
<i>Eclipta alba</i>	Bhringraj	Asteraceae	Whole plant especially leaves	Extract of plant is very powerful liver tonic. It cures jaundice, hemorrhoids and indigestion. For jaundice grind leaves along with pepper to a fine paste, dissolve this paste in buttermilk and consume twice a day. In case of urinary infection, a glass of the extracted juice taken twice daily. Plant is very good for hair growth. Leaf powder is mixed with coconut oil and heated, then cooled and bottled, then applied on the scalp for healthy hair. The herb protects against night blindness and other eye diseases. When the leaves are fried in ghee and consumed regularly, the vision improves. Gargling using the juice of

				the leaves strengthens teeth and gums. Eating fine leaves in the morning cures constipation.
<i>Emblica officinalis</i>	Amla	Euphorbiaceae	Fruits	Due to its high Vitamin C content, it is effecting in controlling diabetes. A tsp of its juice mixed with a tsp of bitter gourd juice taken daily for two months stimulates the pancreas and enable it to secrete insulin, thus reducing the blood sugar in diabetic patients. The juice of amla with honey is good for eyesight. Amla improves body resistance and protects the body against infection. It strengthens the heart, hair and different glands in the body. Tonic is highly beneficial in the treatment of respiratory disorders like tuberculosis, asthma and bronchitis.
<i>Eucalyptus globulus</i>	Safeda	Myrtaceae	Essential oil	Essential oil has antiseptic property. It is used for healing wounds, ulcers, burns, cuts and sores. Oil mixed with warm water treat number of respiratory problems.
<i>Ficus religiosa</i>	Peepal	Moraceae	Latex, twigs, leaves, bark, fruit	Milk/latex from leaves can be applied in eyes to treat eye pain. Brushing teeth with fresh twigs is considered good for teeth. In case of bleeding nose, put some drops of leaf juice in nostrils. Paste of bark is applied on boils, cuts and burns for quick healing. In case of jaundice extract juice of 3-4 soft leaves, mix this juice in water and add sugar, take it 2 times a day for 4-5 days. Take equal part of fruit powder and bark powder (1:1) to get relief from asthma.
<i>Hemidesmus indicus</i>	Anantamula	Asclepiadaceae	Bark, Root, latex and whole plant	Bark powder with black pepper is grinded with water and taken 1-2 times a day for jaundice till cure. Root powder is used for abdominal pain. Mix root powder with arusa leaf powder, take this twice a day with milk for asthma and respiratory diseases. For eye diseases take the roots and rub them on stone, apply the paste in eyes just like kajal and milky exude of plant mixed with honey can also be applied. Take powder of whole plant with honey, three times a day for arthritis.
<i>Hibiscus rosa sinensis</i>	Gudhal	Malvaceae	Roots, leaves and flowers	The juice and extract prepared from leaves, flowers and roots of the plant are used as diuretics, contraceptives, anti-diarrhoea, aphrodisiacs, cough suppressants etc. The leaves and flowers are observed to be promoters of hair growth and aid in healing ulcers. Flowers are found to be effective in the treatment of hypertension and to have significant anti-fertility effect. Juice of flower with coconut oil applied on the hair to prevent hair loss.
<i>Lantana camara</i>	Raimuniya	Verbenaceae	Leaves, roots and flowers	The crushed leaves are effective in snake bites when applied on affected region. Fresh leaves applied as poultice for sprain and wounds. Leaves can be used for relief from headache, fever, flu, cough, colds toothaches and indigestion. The dried Lantana leaves burnt in a glass jar act as natural mosquito repellent. The roots are known to be refrigerant and antifebrile. The decoction of dried roots is used for gonorrhoea, cough, mumps, malaria and influenza. Decoction is used for pulmonary tuberculosis.
<i>Mangifera indica</i>	Aam	Anacardiaceae	Seeds, leaves, fruit, flower and	Seeds are used to treat cold and coughs, obstinate diarrhoea and bleeding piles. Drinking mango leaf tea

			buds	helps to lower blood pressure. Toothache and gum problems can also be cured by rinsing mouth with decoction of two tsp of mango flowers and buds boiled in two cups of water. Eating a ripe mango after a meal helps in relieving constipation Putting few drops of juice extracted from a tender mango kernel in the nostril stop nose bleeding. 1 tsp of crushed leaf buds with neem leaves is useful for diabetes.
<i>Matricaria chamomilla</i>	Chamomile	Asteraceae	Flowers	Extract of flowers calm anxiety and eases stress. Chamomilla tea and oil are safe for children who have trouble in sleeping or are under stress. It is an excellent tonic for the liver and digestive system. Chamomilla teas and essential oil are used in herbal skin washes, healing cuts, scrapes and abrasions, also useful in healing mouth sores and preventing gum diseases, soothe mouth inflammation and keep gums healthy.
<i>Mentha longifolia</i>	Podina	Lamiaceae	Leaves	Leaves are a great appetizer and promote digestion. The strong and refreshing aroma of leaves is a quick and effective remedy for nausea. Strong aroma of mint is very effective in cleaning up congestion of the nose, throat, bronchi and lungs, which gives relief from respiratory disorders and common cold. Regular use of leaves is very beneficial for asthma patients. Mint oil is a good antiseptic and anti-pruritic material, mint juice is an excellent skin cleanser.
<i>Moringa oleifera</i>	Senjana	Moringaceae	Leaves, root, bark, seeds, flowers	The leaves are most nutritious part of the plant. Regularly consuming leaves boost immune system, lower blood pressure, improve digestion and weight loss due to its high fiber, low fat and calorie level. Roots and bark are used to relieve lower back or kidney pain, for cardiac and circulatory problems and as tea for inflammation and digestion. The seeds are edible and can be roasted or grind into powder. Also used in treatment of surgery, skin diseases, insect bites, arthritis cramps and boils. Flowers tea has also been used to cure cold.
<i>Morus alba</i>	Shahtoot	Moraceae	Fruit, bark, leaves	Fruit is used to treat weakness, dizziness, fatigue, anaemia. The bark is used to cure cough, wheezing, oedema, fever and headache, red and sore eyes. The leaves are good for brain, lungs and heart. Also improves digestion, stimulate the appetite and eliminate constipation.
<i>Murraya koenigii</i>	Curry Patta	Rutaceae	Leaves	Leaves help in quick digestion. Intake of leaves help in indigestion, stomach ulcer, diarrhoea and other gastric problems. Also helps in controlling blood sugar level in the diabetic patient to chew and eat a couple of curry leaves along with a few pepper corns in the morning on empty stomach. Leaves taken internally can strengthen bones, improve digestion and strengthen hair roots.
<i>Ocimum sanctum</i>	Tulsi	Lamiaceae	Leaves	Crushed leaves are very effective in fever, cough, bronchitis and other diseases of lungs. Leaves acts as a cardiac tonic and purifies blood. Consuming 10-12 leaves per day helps to reduce stress. Fresh leaf juice mixed with ginger and honey help to reduce cough and cold. Paste of

				leaves applied pains and inflammation. Regular consumption of leaves help to control diabetes and blood cholesterol. Decoction of leaves is very beneficial in fever like dengue and malaria.
<i>Plantago ovata</i>	Isabgol	Plantaginaceae	Seeds	Seeds are able to treat diarrhoea, constipation and act as a safe and effective weight loss aid. It is rich in fiber and remove constipation. The high fiber diet reduces the blood sugar level in people with diabetes. It is a good remedy to reduce irritation of food pipe and stomach during acidity.
<i>Prunus persica</i>	Aru	Rosaceae	Fruits and whole plant	Fruits help in maintaining healthy vision, skin care, brain, healthy bones and teeth. Fresh plant paste is applied on affected skin twice a day to kill germs in wounds and fungal infection. Fruit possess anti-tumor and anti-cancerous properties. Peaches are good for digestive system. Fruits help in strengthening bones and teeth.
<i>Psidium guajava</i>	Amrood	Myrtaceae	Fruit and leaves	Fruit intake can help in decreasing blood pressure. Tea made from leaves may help to cure diarrhoea. Eating 1 to 2 fruits without the peel help in maintaining blood sugar. Those who are at risk of developing diabetes can prevent it by taking leaf tea. Eat 1 fruit daily to develop resistance against common diseases like coughs, colds and the flu. Drinking leaf tea prepared by the dried leaves in hot water helps to lower total cholesterol.
<i>Punica granatum</i>	Anar	Lythraceae	Fruit and leaves	Intake of fruit juice maintains flow of blood in the body. It reduces the risk of heart attack and heart strokes. Peel, bark and leaves are used to cure stomach disorder and diarrhoea. Drinking tea made from leaves of fruits help in curing digestive problems. Anti-bacterial and anti-viral properties of fruit helps to reduce the effect of dental plaque. Fruits are also useful for diabetic and anaemic patients.
<i>Rauwolfia serpentina</i>	Sarpagandha	Apocynaceae	Roots and leaves	Root powder is used to treat high blood pressure and nervous disorders because it has hypnotic sedative effect. Root powder is taken orally as an antidote to snake venom. Extracts of roots are valued for treatment of intestinal disorder, particularly diarrhoea and dysentery. Decoction of the root is helpful to stimulate uterine contraction and recommended for use in complications during child birth. Juice of the leaves cure opacity of the cornea.
<i>Ricinus communis</i>	Arand	Euphorbiaceae	Roots, leaves and oil	Roots are used in treatment of a swelling, fever, abdominal diseases, arthritis, rheumatic pain in lumbar region. The leaves are used for painful urination and colic pain in the bladder. For the treatment of jaundice take 4-5gm of fresh leaves and grind them, then add to boiling water and make decoction and drink twice daily. During irritation in eyes due to dust put 2-3 drops of castor oil in eye to clean dust.
<i>Spilanthes acmella</i>	Akarkara	Asteraceae	Flowers and leaves	The flower heads are chewed to get relief from toothache and other mouth related troubles. Leaves are used externally in treatment of skin diseases. Chewing leaves is useful in affection of throat and gums.



<i>Stevia rebaudiana</i>	Meethi patti	Asteraceae	Leaves	High content of fibre in leaves helps in curing constipation and proper digestion. Also stimulate the production of hemoglobin and helps to lower blood sugar.
<i>Syzygium cumini</i>	Jamun	Myrtaceae	Fruit, seeds and leaves	Consumption of fruit minimizes the risk of cancer. Powder of dried seeds is effective in reducing high blood sugar. Ash of burnt leaves is rubbed on teeth to strengthen them. Eating fresh leaves are good in treating diarrhoea, ulcers and liver disease. Leaves are rich in iron make them a good blood purifies
<i>Tagetes erecta</i>	Genda	Asteraceae	Leaves and flowers	Leaves applied to boils and carbuncles, leaf juice used for earache. The juice of flowers used as blood purifier and as remedy for piles. Decoction of flower used for colds, conjunctivitis, mumps, sore eyes. Leaves internally used for indigestion, severe constipation, cough and dysentery.
<i>Vitex negundo</i>	Nirgundi	Verbenaceae	Leaves and seed oil	The dry leaves are burnt and fumes are inhaled to relieve headache and running nose. Seed oil is used in wound healing and grey hairs. The leaves are made into paste, healed a little and applied externally to relieve headache, arthritis and osteoarthritis. Decoction of leaves is good for ulcers, boils and wound, wash the affected area with this decoction. Apply poultice of fresh leaves on sprained area.

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